THE EYES AND OF THE

WHEN you pick up the telephone, dial a number and almost immediately speak to someone at the other side of the country you are using a system as intricate as that employed in the generation of electricity itself.

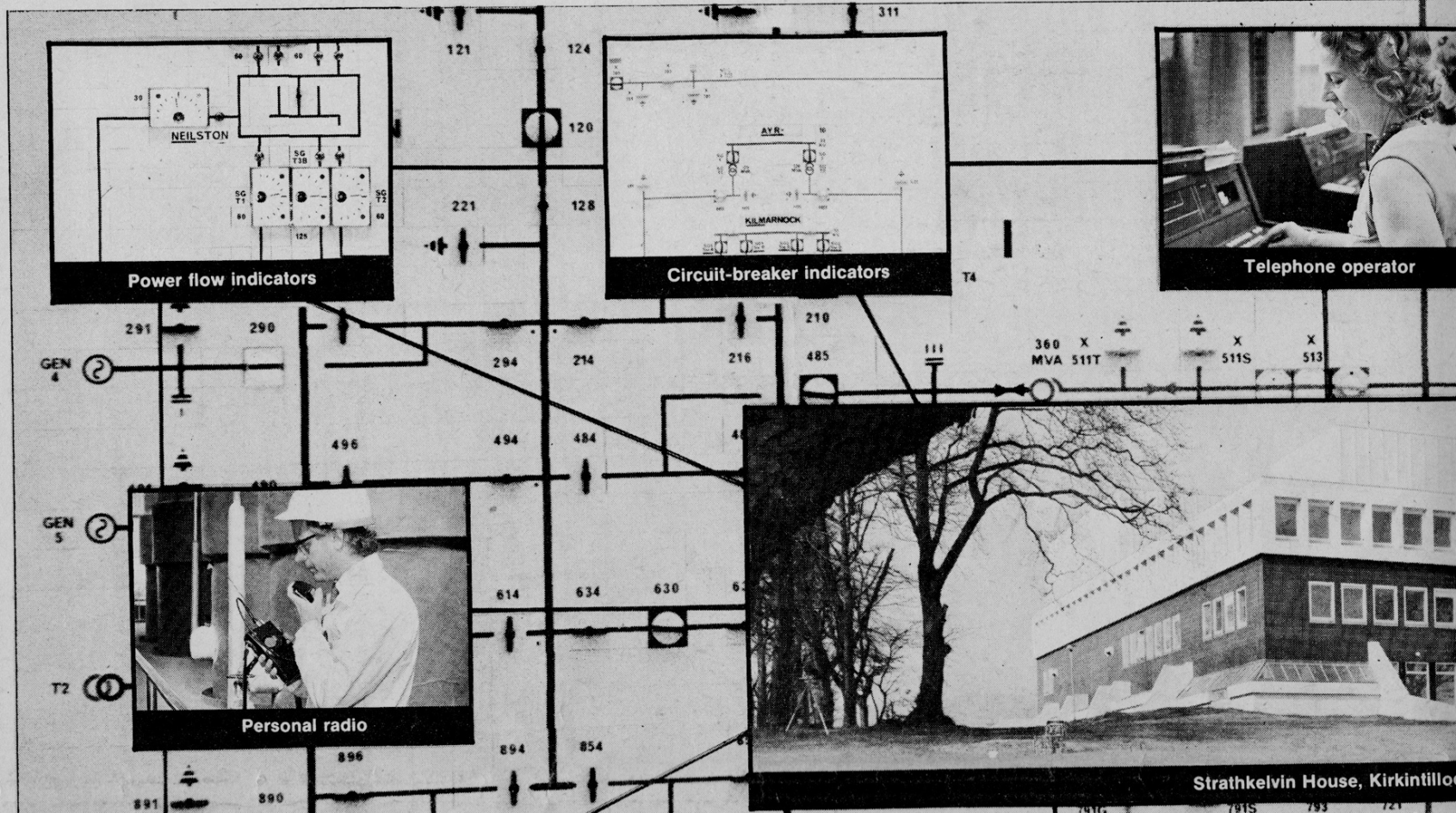
The telephone, like other means of communication with distant places, is an invention we take for granted yet telecommunications is something without which the Board could scarecly function.

by KEN HOUSTON

Most employees have occasion to use a small part of the telecommunications system at least once every day by making a call on the PAX (Private Automatic Exchange) telephone. Telecommunications, however, has many other functions, including the display of remote indications and telemetering at the grid control centres, remote control of grid substations and bulk supply points from Distribution control centres, the mobile radio system and, of course, the provision of communication links so that these systems will function.

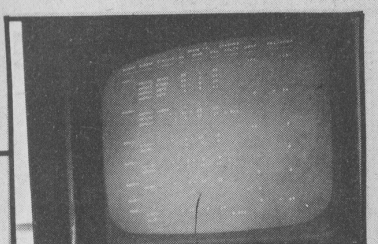
The Telecommunications section is as old as the grid system itself.

Earlier this century, the electricity supply industry could be compared to Western Europe before the advent of the Common Market. Like States, power companies worked with complete autonomy, concentrating solely on the supply of electricity to consumers within their own particular area. In terms of sharing power, there was little or no integration.



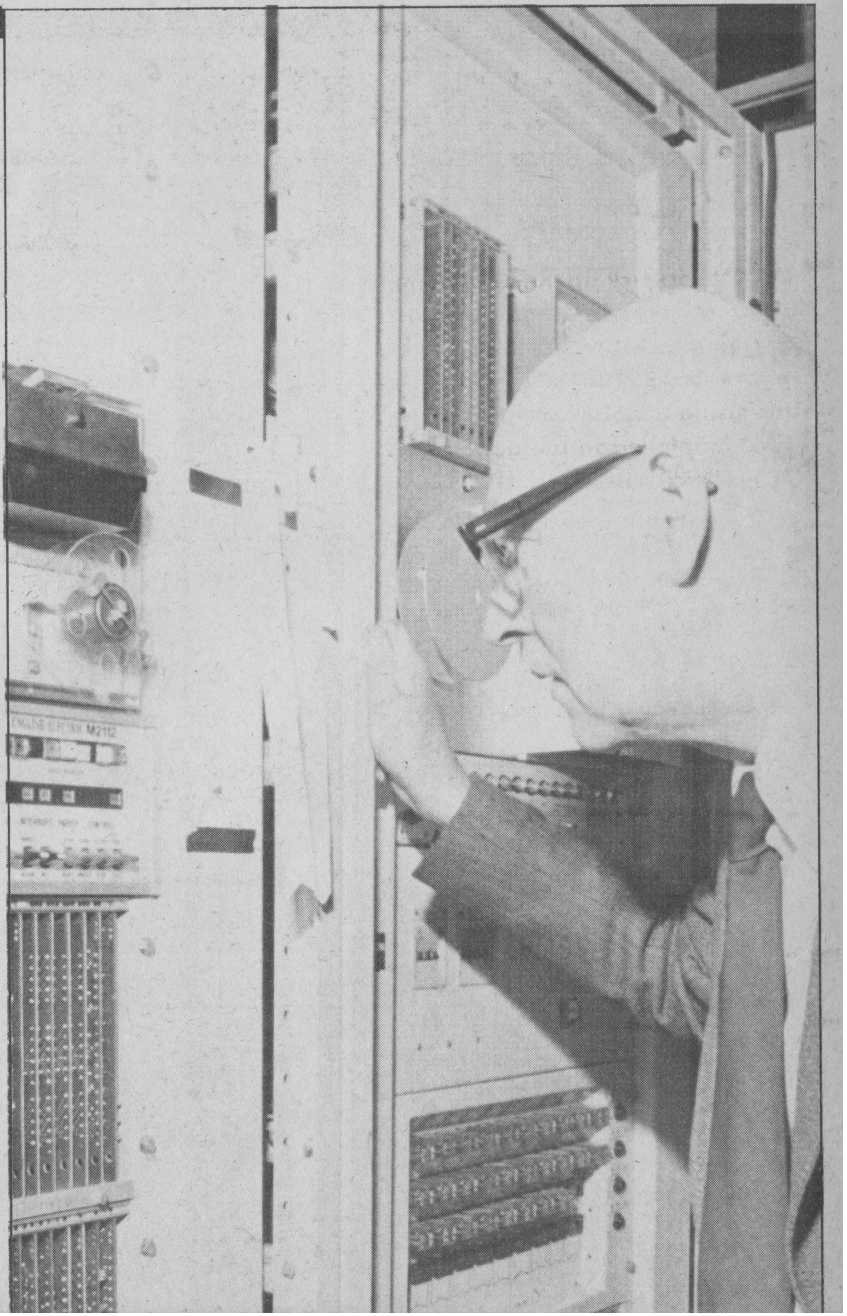
EARS SYSTEM

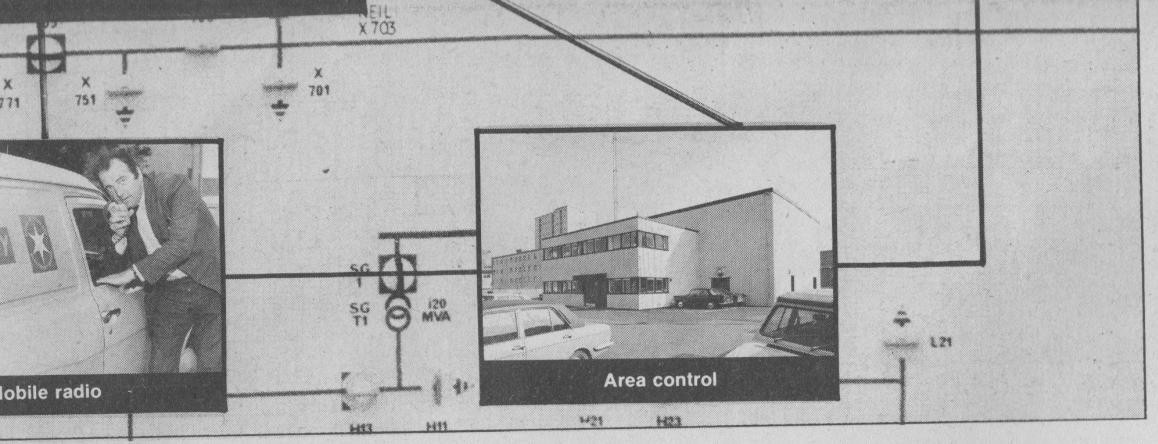
Operational telephone



TV viewer

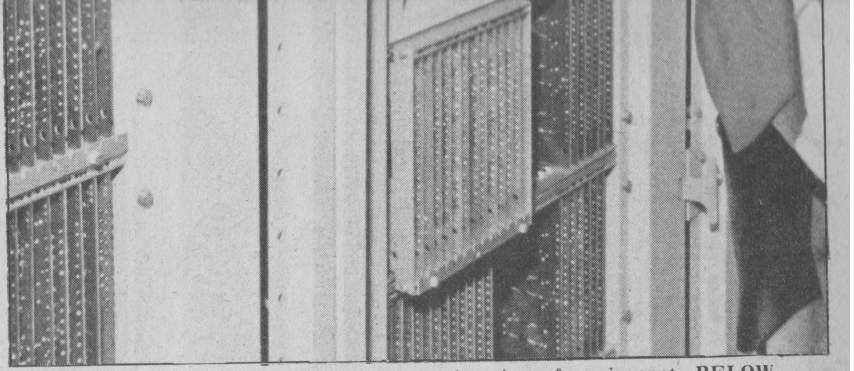
Hilltop radio station





obile radio

Area control



ABOVE — Mr S. A. Soutter checks the function of equipment. BELOW — Maintenance engineers J. Boyd and A. Sims at work at the test desk where every circuit can be tested to ensure it is functioning correctly.

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multi-channel radio links to inter-connect urban areas.

"By doing this we are not trying to put the Post Office out of business; quite simply we don't want to risk being caught out by any situation for which we are not responsible and which is outwith our control."

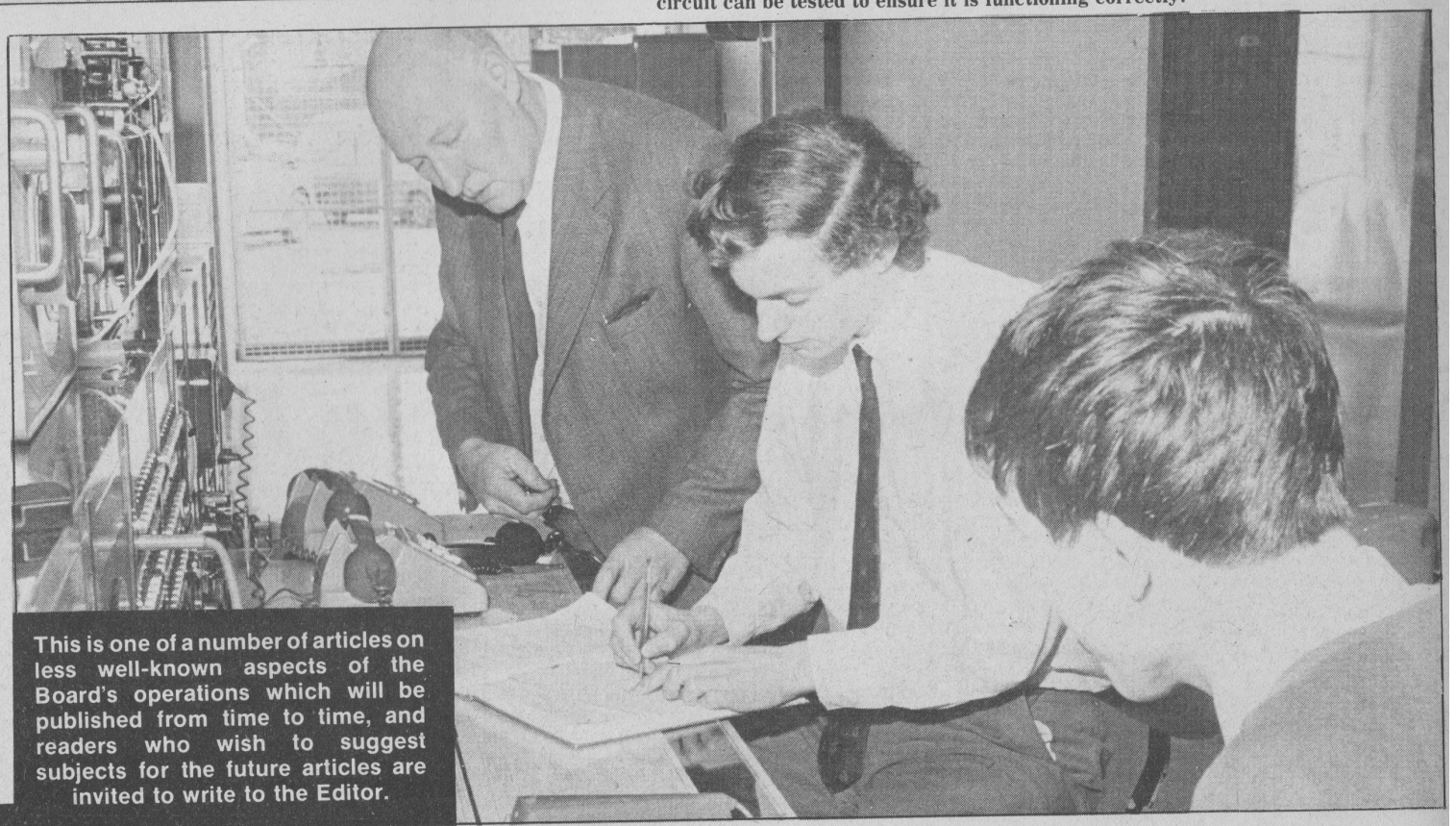
To make maximum utilisation of both Post Office and private circuits — which are expensive — the Telecommunications section have a technique known as "multi-plexing" in which the speech band is somewhat restricted but which enables them to accommodate up to 10 signalling channels at frequencies above the speech band on the same telephone circuit.

Circuit

These signalling channels are used for remote control, telemetering, teleprinters, protection signalling and telephone dialling.

A further example of multi-plexing is employed on pilot cables to increase the circuit capacity. In this system as many as 24 speech channels can be accommodated on a single pair of wires.

Following my conducted tour around Strathkelvin House I'm not only better informed as to the intricacies of Telecommunications but I also find myself more mild-mannered. Now that I know what goes on behind a simple telephone call I no longer bawl down the receiver at the operator when, occasionally, the 'phone goes wrong.



This is one of a number of articles on less well-known aspects of the Board's operations which will be published from time to time, and readers who wish to suggest subjects for the future articles are invited to write to the Editor.

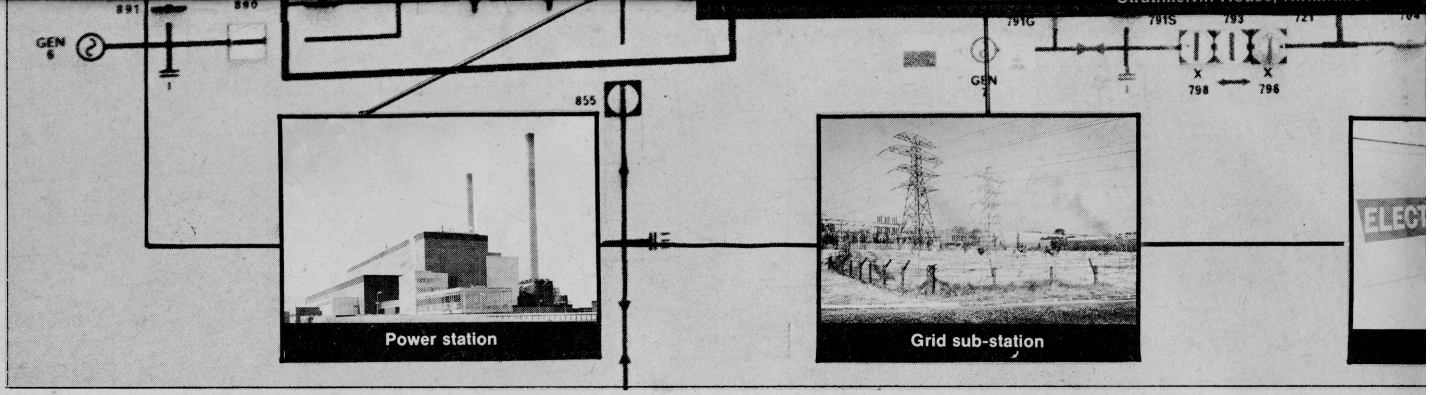
Grid

The development of the national grid, by which power could be distributed nationally, changed all that but it was soon realised that the new system could not be run blind and that communications and the remote display of circuit-braker indicators would be required. The problem was solved by engaging a number of telecommunications contractors who were able to apply techniques and equipment already being used in automatic telephony.

The national grid and telecomunications in electricity were born almost simultaneously. It is hardly surprising, therefore, that a large part of the SSEB's telecommunications system should now be based on the Grid Control Centre, Strathkelvin House, Kirkintilloch, which opened two years ago as a replacement of older premises.

At Strathkelvin House is a large mimic diagram, 13ft high by 80ft long — 1040 sq ft in area — on which is displayed a diagram of the complete grid system, with 400 kv lines shown in blue, 275 kv in red and 132 kv in black. All the circuit-breaker indications, along with some 400 telemetered quantities recording power station outputs, power flow in grid lines and voltage and frequency in the system, are transmitted from the power stations and substations to the Control Centre by telecommunications equipment.

Another reason for the growth of the Telecommunications section has been the cost and difficulty of obtaining personnel to man remote substations. "Now, with the installation of remote control equipment, practically all substations except those adjacent to power stations are automatically operated.



Radio plays a big part in the section's work. The Board have 1700 mobile radios in Engineering and Commercial vehicles — about 500 for each Area — plus 40 hilltop stations. The remainder of the radios are used to provide services for Transmission operations and for emergency communication with power stations.

Since many hilltop stations re, naturally, in remote areas they in turn are remote-controlled from district offices and/or control centres.

In addition to the mobile radio systems there are about 1000 personal radio units used in the power stations for staff location and intercommunication purposes.

The Board use three telephony systems— the national Post Office system, the PAX system and the Operational Telephone System.

There are automatic telephone exchanges in every power station, Area office and district office, all of which are also inter-connected by the PAX lines which permit personnel to dial from any office to any other within the Board's territory.

Data

When all other forms of intelligence fail one of the most important facilities to the operational staff is telephony. Since Post Office lines have to be rented in order to provide the Board with data channels the Operational Telephone System functions over these same rented or private circuits.

In order to save time and prevent the loss of accuracy which might be involved by using telephone directories, the OTS functions by a method of key calling in which the control engineer has or the appropriate key to be aut connected to the station of his this system the control centre ha priority and can knock administrative call in progress.

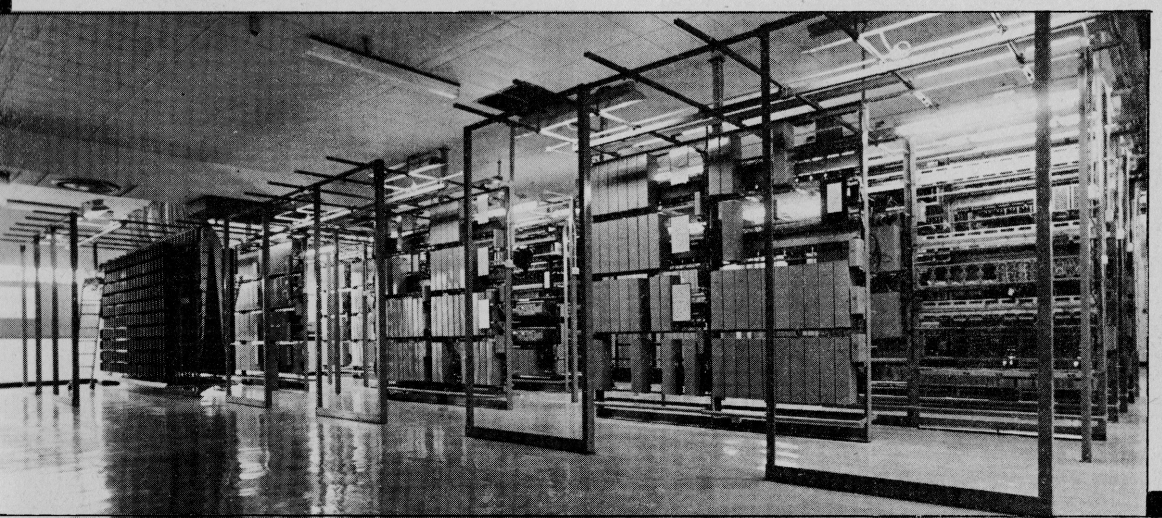
It is by using the telecomm system — through our own line leased from the Post Offic personnel at Grid Control and power stations, Longannet and can "talk" direct to the computer at Cathcart.

Should Grid Control require in regarding, for example, powe transmission lines, the request w the computer via the telecomm lines. Once the computer has wor answer the information will be fl a television screen at Grid Cor the same lines.

Similarly, the two power st receive information regarding efficiency in this manner.

Cables

The engineer in charge of communications section is Mr S who told me that the Board re circuits from the Post Of addition," he said, "we have own pilot cables — in which telep are concealed—in urban areas, expensive laying pilot cables distances we are now beginni



LEFT — A section of the Telecommunications apparatus room which occupies 4000 sq ft of floor space at Grid Control Centre, Kirkintilloch.